**Course:** 8th math  **CCSS Standard(s) Number:** 8.NS.1 **Day(s):** 1

**Unit # and Title: Unit 1 Expressions and the Number System Block(s)/Period(s):** **1** **2** **3** **4** **5** **6**

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| **Unit Essential Question(s):** | **In what ways can rational numbers be useful?** | | |
| **Learning Target(s)**  **“I can statements”** | * **I can show that all numbers have a decimal expansion.** * **I can illustrate that the decimal expansion of a rational number eventually repeats.** * **I can convert repeating decimals to a rational number.** | | |
| **Essential Vocabulary** | * **repeating decimal** * **terminating decimal** * **decimal expansion** | | |
| **Resources and Materials** | **Teacher** | | **Student** |
| **On Core Workbook Section 1-5**  **Full Size Hershey Candy Bar**  **Decimal Place Value Chart (**[**http://www.mathwecan.com/tables-charts-home.html**](http://www.mathwecan.com/tables-charts-home.html)**)** | | **On Core Workbook Section 1-5** |
| **8 Mathematical Practices:** | | | |
| 1. Make sense of problems and persevere in solving them.  2. Reason abstractly and quantitatively.  3. Construct viable arguments and critique the reasoning of others.  4. Model with mathematics. | | 5. Use appropriate tools strategically.  6. Attend to precision.  7. Look for and make use of structure.  8. Look for and express regularity in repeated reasoning. | |
| **Activating Strategy**  **(Opening Activity)** | **Have two students come to the front of the room and ask them to split a Hershey’s candy bar in half. The students must then write the fraction of the candy bar they have on the board (1/2, or possibly 6/12). The students will then place the fractions on a number line.**  **Have two more students come to the front of the room and further break the candy bar equally. The students must then write the fraction of the candy bar that they now have on the board (1/4, or possibly 3/12). The students will then place the fractions on a number line.**  **Have a discussion about fractions. What does the fraction ½ mean? What type of number is it? What are equivalent fractions? Are there other ways to write a fraction (try to get them to recognize a fraction can be written as a decimal)?**  **Have a discussion about decimals. Why do we need to write fractions as decimals?** | | |
| **Cognitive Teaching Strategies**  **Me/We/Few/You**  **(TIP-Teacher input**  **SAP-Student actively participates**  **GP – Guided Practice**  **IP-Independent Practice)** | **ME/SAP: Break the students into 5 groups. Tell the students they each have one dollar to go to the store and buy their favorite candy bar. Each group is going to represent the dollar differently.**  **Group 1-$1.00 bill (1.00) (1/1)**  **Group 2-4 quarters (.25) (1/4)**  **Group 3-10 dimes (.10) (1/10)**  **Group 4-20 nickels (.20)(1/5)**  **Group 5-100 pennies (.01)(1/100)**  **Have each group write the decimal for their coin and the matching fraction. The students must then find a way, without a calculator, to change the decimal into their fraction. How did they do it? Is the same process used to change every fraction into a decimal?**  **Introduce the vocabulary word terminating decimal.**  **Now tell the students that when they got to the store they found out the candy bars were on sale and after they each bought one they had about 1/3 of a dollar left over. Have each group write 1/3 as a decimal and explain their process.**  **Introduce the vocabulary word repeating decimal.**  **WE/TIP: On Core Workbook: Show example 1a, 1b on p 19**  **FEW/GP: On Core Workbook: Try This p 20 1a, 1b, 1c**  **Review Decimal Places with Chart**  [**http://www.mathwecan.com/tables-charts-home.html**](http://www.mathwecan.com/tables-charts-home.html)  **WE/TIP: On Core Workbook: Show examples 2a, 2b**  **FEW/GP: p 21 2a, 2b, 2c, 2d**  **YOU/IP: Students will be presented with three collections of fractions that represent sports data respectively:**   * **Volley ball - aces over serves ~ 35/180(.19444), 49/180(.27222), 127/180(.70555), 20/180(.11111)** * **Basketball – 3 pointers made over 3 pointers attempted ~ 48/93(.51612), 29/67(.43283), 13/26(.50000), 71/156(.45512).** * **Baseball – hits over at bats ~ 190/236(.8050), 154/300(.5133), 267/500(.5340), 290/373(.7774).**   **It is expected that students will be able to order and compare the fractions with like denominators however; this activity requires students to use another method, i.e. convert the given fractions to decimals, supporting their argument for selecting the best performing Olympic candidate from each category.** | | |
| **Summarizing Strategy**  **(Closing Activity)** | **Fraction Mix and Match Activity**  **Match the Fraction with the correct decimal:**  **½=.5**  **1/3=.**  **1/4=.25**  **1/5=.2**  **1/6=.1**  **1/7=.**  **1/8=.125**  **1/9=.**  **1/10=.1** | | |
| **Assessment/Homework** | **HW: On Core Workbook p 21/22 #1-12, 20-23** | | |
| **Extending/Refining** | **Extension: On Core Workbook p 22 #24, 25, 26**  **Refining: Destination Math Grades 6-8 Chapter 2, Section 3** [**Exploring Repeating and Terminating Decimals**](http://destination.gcsnc.com/content/math/destination_math/msc4/msc4/msc4/MSC4/MSC4/Module2/Unit1/Session3/Tutorial.html?USERID=0&ASSIGNID=0) | | |

**Course:** 8th Math  **CCSS Standard(s) Number:** 8.NS.1 **Day(s):** 2

**Unit # and Title:** Unit 1 Expressions and the Number System  **Block(s)/Period(s): 1 2 3 4 5 6**

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| **Unit Essential Question(s):** | **In what ways can rational numbers be useful?** | | |
| **Learning Target(s)**  **“I can statements”** | **I can classify a number as rational or irrational based on its decimal expansion.** | | |
| **Essential Vocabulary** | **Real number**  **Rational number**  **Irrational number**  **Natural number**  **Whole number**  **Integer**  **Repeating decimal**  **Terminating decimal**  **Non-terminating decimal** | | |
| **Resources and Materials** | **Teacher** | | **Student** |
| [**Real Number Chart**](http://www.dpi.state.nc.us/docs/curriculum/mathematics/middlegrades/grade08/goal01/objective1.01a/1.01a-tasks/1.01a-realnumbersystem.pdf) **(answers)** | | [**Real Number Chart**](http://www.dpi.state.nc.us/docs/curriculum/mathematics/middlegrades/grade08/goal01/objective1.01a/1.01a-tasks/1.01a-realnumbersystem.pdf) **(blank copy)**  **Calculator**  **Name Tags or Index Cards** |
| **8 Mathematical Practices:** | | | |
| 1. Make sense of problems and persevere in solving them.  2. Reason abstractly and quantitatively.  3. Construct viable arguments and critique the reasoning of others.  4. Model with mathematics. | | 5. Use appropriate tools strategically.  6. Attend to precision.  7. Look for and make use of structure.  8. Look for and express regularity in repeated reasoning. | |
| **Activating Strategy**  **(Opening Activity)** | **Have students enter on a calculator and look at the result (1.414213562). What type of decimal is it? Now have students enter 1.4142135622 on the calculator (1.999999999). What type of decimal it?**  **Explain that because is not a perfect square, there is no exact decimal representation for it and because of that it is a non-terminating decimal, which is an irrational number. Every other number is considered a rational number.** | | |
| **Cognitive Teaching Strategies**  **Me/We/Few/You**  **(TIP-Teacher input**  **SAP-Student actively participates**  **GP – Guided Practice**  **IP-Independent Practice)** | **ME/TIP: Review the** [**Real Number Chart**](http://www.dpi.state.nc.us/docs/curriculum/mathematics/middlegrades/grade08/goal01/objective1.01a/1.01a-tasks/1.01a-realnumbersystem.pdf) **by giving the student a copy of the diagram. Have students explore the numbers in each section. Ask them to place another number that could possibly go in each section (the students may not know at this point). Have students share their answers and lead a discussion about what types of numbers can go in each category.**  **WE/SAP: Ask the following clarifying questions.**  **How are the natural and whole numbers different?**  **How are the integers and rational numbers different?**  **How are the integers and rational numbers the same?**  **How are integers and whole numbers the same?**  **Can a number be both rational and irrational?**  **FEW: Rational or Irrational Number Partner Activity. Have one partner be a “rational” answer choice and the other an “irrational” answer choice (use white boards, name tags, index cards, etc.) Display the questions from the following website and have them decide which partner should stand up.** [**http://www.quia.com/pop/37541.html**](http://www.quia.com/pop/37541.html)  **YOU: “Golden Nugget Ticket” (Collect as a ticket out the door at the end of class and have a drawing for the correct answers.)**  **Explain in your own words how the decimal expansion form of a number helps us determine if a number is rational or irrational.** | | |
| **Summarizing Strategy**  **(Closing Activity)** | **Classifying Numbers Game**  [**http://staff.argyll.epsb.ca/jreed/math9/strand1/munchers.htm**](http://staff.argyll.epsb.ca/jreed/math9/strand1/munchers.htm) | | |
| **Assessment/Homework** | **These are, are not rational numbers sorting activity or the students could create a t-chart using the numbers in the activity.**  [**http://www.dpi.state.nc.us/docs/curriculum/mathematics/middlegrades/grade08/goal01/objective1.01a/1.01a-tasks/1.01a-arearen'tirrational.pdf**](http://www.dpi.state.nc.us/docs/curriculum/mathematics/middlegrades/grade08/goal01/objective1.01a/1.01a-tasks/1.01a-arearen'tirrational.pdf) | | |
| **Extending/Refining** | **Extension: Create two real world problems that are solved using real numbers and decimal expansion.  One problem must use rational numbers and the other must use irrational numbers.**  **Refining:** [**Real Number System Flow Chart**](http://itech.pensacolastate.edu/falzone/handouts/number_system.pdf) **(excluding Complex Numbers on Top)** | | |